

171,173 I
radiating antenna (1) and multiple thermocouples (6,6',6"), the radiating antenna [being] adapted to be submerged within a fluid flow, characterized in that

171,173 I
said radiating antenna (1) [is] adapted to be submerged within a flow which proceeds through a central channel (2) surrounding said radiating antenna (1) towards the distal end of said catheter and passes from said catheter through a first opening (3) into a bladder to be treated, while flowing back into said catheter towards [the] a proximal end thereof through a second separate opening (4) of a side channel (5) surrounding [the] power supply cables of said thermocouples (6,6',6"),

171,173 I
[the] ends of said thermocouples (6,6',6") are adapted to project out of said second opening (4), being thus deflected outwards into the bladder when said balloon (7) is inflated by injecting a fluid through a second side channel (8) and third opening (9), whereby [the] outwardly deflected ends of said thermocouples (6,6',6") are adapted to come into tangential engagement with a bladder wall (32) irradiated by said antenna (1).

2. A radiating device including a catheter provided at its distal end with an inflatable balloon and adapted to receive multiple injected liquid fluid flows passing therethrough, a radiofrequency radiating antenna and multiple thermocouples, the radiating antenna adapted to be submerged within a fluid flow, characterized in that
said radiating antenna is adapted to be submerged within a flow which proceeds through a central channel surrounding said radiating antenna towards a distal end of said catheter and passes from said catheter through a first opening into an organ to be treated, while flowing back into said catheter towards a proximal end thereof through a second

separate opening of a side channel surrounding power supply cables of said thermocouples,

ends of said thermocouples are adapted to project out of said second opening, being thus deflected outwards into the organ when said balloon is inflated by injecting a fluid through a second side channel and third opening, whereby the outwardly deflected ends of said thermocouples are adapted to come into tangential engagement with a wall of the organ irradiated by said antenna.

3. A radiating device including a catheter provided at its distal end with an inflatable balloon and adapted to receive multiple injected liquid fluid flows passing therethrough, a radiofrequency radiating antenna and multiple thermocouples, the radiating antenna adapted to be submerged within a fluid flow, characterized in that
said radiating antenna is adapted to be submerged within a flow which proceeds through a central channel surrounding said radiating antenna towards a distal end of said catheter and passes from said catheter through a first opening into an organ to be treated, while flowing back into said catheter towards a proximal end thereof through a second separate opening of a side channel surrounding power supply cables of said thermocouples,

ends of said thermocouples are adapted to project out of said second opening, being thus deflected outwards into the organ when said balloon is inflated by injecting a fluid through a second side channel and third opening, whereby outwardly deflected ends

LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

of said thermocouples are adapted to come into engagement with a wall of the organ irradiated by said antenna.

6. A radiating device for irradiating an organ comprising:
a catheter provided with an inflatable balloon;
an antenna, situated at an end portion of the catheter, adapted for irradiating the organ;

a channel adapted to provide a fluid to the organ; and
a plurality of thermocouples, having ends, the plurality of thermocouples
extending along the catheter, each of the ends of the plurality of thermocouples being
deflected outwards when the balloon is inflated,
wherein the deflected ends of the plurality of thermocouples are adapted to contact
a wall of the organ irradiated by the antenna.

8. A radiating device for irradiating an organ comprising:
a catheter provided with an inflatable balloon;
an antenna, situated at an end portion of the catheter, for irradiating the organ;
a channel adapted to provide a fluid to the organ; and
a plurality of temperature sensing devices, having ends, the plurality of
temperature sensing devices extending along the catheter, each of the ends of the plurality
of temperature sensing devices being deflected outwards when the balloon is inflated.

3
wherein the deflected ends of the plurality of temperature sensing devices are adapted to contact a wall of the organ irradiated by the antenna.

4
40. The radiating device according to claim 11, wherein the catheter comprises a first opening adapted to provide the fluid into the cavity and a second opening adapted to allow for circulation out of the cavity.

41. The radiating device according to claim 34, wherein the catheter comprises a first opening adapted to provide the fluid into the cavity and a second opening adapted to allow for circulation out of the cavity.

42. The radiating device according to claim 41, wherein the catheter comprises a third opening adapted to provide a second fluid to inflate the balloon.

80. A radiating device for irradiating a cavity comprising:
a catheter;
an antenna, situated at an end portion of the catheter, for irradiating the cavity;
a first channel adapted to provide a fluid to the cavity;
a second channel adapted to receive the fluid from the cavity; and
at least one temperature sensing device, having an end, the end of the at least one
temperature sensing device extending outward from the catheter after the catheter is
inserted into the cavity.

15
LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

wherein the end of the at least one temperature sensing device is adapted to detect
a temperature of a wall of the cavity irradiated by the antenna.

81. A radiating device for irradiating a cavity comprising:

a catheter;

an antenna, situated at an end portion of the catheter, for irradiating the cavity;

a first channel adapted to provide a fluid to the cavity;

a second channel adapted to receive the fluid from the cavity; and

at least one temperature sensing device, having an end, the end of the at least one
temperature sensing device extending outward from the catheter after the catheter is
inserted into the cavity,

wherein the end of the at least one temperature sensing device is adapted to detect
a temperature of the cavity irradiated by the antenna.

83. A radiating device for irradiating an organ comprising:

a catheter;

an antenna, situated at an end portion of the catheter, for irradiating the organ;

a channel, within the catheter, adapted to provide a fluid comprising a treatment
substance to the organ; and

at least one temperature sensing device, having an end, the end of the at least one
temperature sensing device extending outwards from the catheter after the catheter is
inserted into the organ.

LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

wherein the end of the at least one temperature sensing device is adapted to
contact a wall of the organ irradiated by the antenna and wherein the fluid is adapted to be
provided to the organ simultaneously with the irradiation of the organ.

84. The radiating device according to claim 83, wherein the treatment
substance comprises a cytotoxic substance.

85. A radiating device for irradiating an organ comprising:
a catheter;
an antenna, situated at an end portion of the catheter, for irradiating the organ;
a first channel, within the catheter, adapted to provide a fluid comprising a
cytotoxic substance to the organ;
a second channel, within the catheter, adapted to receive the fluid from the cavity;
and
at least one temperature sensing device, having an end, the end of the at least one
temperature sensing device extending outward from the catheter after the catheter is
inserted into the organ,
wherein the end of the at least one temperature sensing device is adapted to
contact a wall of the organ irradiated by the antenna and wherein the fluid is adapted to be
provided to the organ simultaneously with the irradiation of the organ.

LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

33

86. A radiating device for irradiating an organ comprising:
a catheter;
an antenna, situated at an end portion of the catheter, for irradiating the organ;
a first channel, within the catheter, adapted to provide a fluid comprising a
cytotoxic substance to the organ;
a second channel, within the catheter, adapted to receive the fluid from the cavity;
and
at least one temperature sensing device, having an end, the end of the at least one
temperature sensing device extending outward after the catheter is inserted into the organ,
wherein the end of the at least one temperature sensing device is adapted to detect
a temperature of the fluid and wherein the fluid is adapted to be provided to the organ
simultaneously with the irradiation of the organ.

87. A method of performing hyperthermal therapy comprising the steps of:
inserting a catheter, including an antenna and at least one temperature sensing
device, into an organ;
irradiating the organ by generating radiation using the antenna;
providing a supply of a fluid through the catheter and into the organ;
extracting the fluid from the organ through the catheter; and
extending the at least one temperature sensing device adapted to detect a
temperature of a wall of the organ.

LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

34

17

90. A method of performing hyperthermal therapy comprising the steps of:
inserting a catheter, including an antenna and at least one temperature sensing
device, into an organ;
irradiating the organ by generating radiation using the antenna;
simultaneously with irradiating, providing a supply of a fluid comprising a
cytotoxic substance through the catheter and into the organ; and
extending the at least one temperature sensing device adapted to contact a wall of
the organ.

LAW OFFICES

FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000